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Log of Meeting
Directorate for Engineering Sciences

SUBJECT: Threshold Short-Circuit Current at Which a Circuit Breaker Instantaneously Trips.

PLACE: CPSC Headquarters, Bethesda, Maryland

DATE OF MEETING: July 5, 1994

ENTERED IN THE LOG BY: Ted Gordon, ESEE

DATE OF ENTRY: July 7, 1994

THOSE FROM THE COMMISSION WHO ATTENDED:

Ted Gordon, ESEE
Larry Moskowitz, ESEL
Linda Edwards, ESEE
Edward Krawiec, ESEE
William King, Jr., ESEE

OTHERS WHO ATTENDED:

Frederick F. Franklin, P.A.C.E., Inc.
Timothy Feldman, NEMA
Vince Baclawski, NEMA
Larry Miller, NEMA
John Young, Siemens Energy & Automation
Robert J. Clarey, Eaton/Cutler-Hammer
George Gregory, Square D Company
Nick Wakeman, Product Safety Letter

Frederick Franklin of P.A.C.E., Inc. arranged this meeting with CPSC's Engineering staff for the purpose of delivering his opinion that most residential circuit breakers do not prevent fire when "arcing short circuits," as he terms it, develop in power and extension cords. His solution: that the circuit-breaker industry should modify circuit breakers so they trip instantaneously at a much lower short-circuit current. Representatives of the circuit-breaker industry were on hand during his presentation to watch.

Summary

Mr. Franklin began with a video tape that illustrated the effects of arcing short circuits under the protection of variously-rated breakers. The effects included sparks repeatedly spewing, molten globules flying, and cloth in the vicinity igniting, all without the breaker intervening. He bolstered his presentation by citing a UL report that presents the very changes he is advocating and by presenting a series of graphs of breaker trip times vs. fault currents and vs. energy (let-through energy, I^2t). Mr. Franklin's point is that some breakers pass far too much energy to be effective against particular fire-producing electrical failures.

In rebuttal to his presentation, circuit-breaker representatives recited the conceptual limits of the circuit breaker: it is intended not to protect extension cords, power cords, or appliances—only branch-circuit wiring. Mr. Franklin countered that, in his practice, he has seen evidence of arcing short circuits behind walls, in-line in branch-circuit wiring, not arising from ill-placed nails or staples but from some bend or twist during installation long ago that may have damaged insulation and set up micro-current leakage that took years, perhaps decades, to evolve. One industry representative, though, lays such failures to faulty installation, which, he emphasized, is outside the breaker's range of responsibility.

Mr. Krawiec of CPSC then joined the discussion questioning the representatives why the breaker's range of responsibility, being that it is conceptual, couldn't be extended? He asked whether resistance to change reflects economic or technical barriers.

Technical, one representative offered. Nuisance tripping's chances will be aggravated, especially where motors are present, given as they are to current surges when they start up. Another question Krawiec posed: Are there any innovations imminent, breakers aside, that would mitigate the problems Mr. Franklin is bringing to our attention? Nothing specific, but research is always being conducted, was one representative's response.

This representative then went on to challenge the cited UL report, at least as far as Franklin's purposes go, as a mere fact-finding study without binding conclusions. To that, William King noted that UL's report does in fact include proposed amendments to the UL circuit-breaker standard and the National Electric Code, amendments that accord with Mr. Franklin's position. Mr. King went on, however, to remark that, when the time for voting on the amendment came, UL joined with the rest of the code panel to reject it.

At that point, the time allotted spent, Mr. Franklin thanked the assembly for its attention and Mr. King adjourned the meeting.